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A REVIEW OF THE SERRANID FISH GENUS *ANTHIAS* OF THE
HAWAIIAN ISLANDS, WITH DESCRIPTIONS OF TWO NEW
SPECIES

By John E. Randall



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The *Science Bulletin* and *Contributions in Science* of the Natural History Museum of Los Angeles County were merged into a single imperial octavo serial, retaining the name *Contributions in Science* and beginning with Number 301.

This serial has been newly formatted for maximum use of typography and illustrations per page, and sized for maximum use of paper. All photography has been produced utilizing a 200-line screen for detail.

Since most institutions rebind *Contributions in Science* collectively into hardbound volumes, and many researchers using them desire to photocopy material, two new features have been incorporated into the new format. A suggested citation line provides the abbreviated serial title, year, number of publication, and total pagination, and appears in the lower left corner of each page; and pages of *Contributions in Science* have been printed off-center to provide a two-inch gutter between adjacent pages for easier accessibility in photocopying.

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A REVIEW OF THE SERRANID FISH GENUS *ANTHIAS* OF THE HAWAIIAN ISLANDS, WITH DESCRIPTIONS OF TWO NEW SPECIES¹

By John E. Randall²

ABSTRACT: The serranid fish genus *Anthias* is represented in the Hawaiian Islands by three species: *thompsoni* (Fowler), which is distinctive in lacking prolonged dorsal spines, usually having 16 dorsal soft rays and 7 anal soft rays, and 50 to 58 lateral-line scales; *bicolor*, new species, with the second and third dorsal spines of adults prolonged, usually with 17 dorsal soft rays, 7 anal soft rays, 57 to 64 lateral-line scales, and males with a thickened and pointed upper lip; and *ventralis*, new species, with no prolonged dorsal spines, usually with 17 dorsal soft rays, 9 anal soft rays, and 39 to 46 lateral-line scales. *A. ventralis* is divided into two subspecies, the Hawaiian *A. v. hawaiiensis*, and *A. v. ventralis* from other localities in Oceania.

In their *Handbook of Hawaiian Fishes* Gosline and Brock (1960) listed ten species of serranid fishes, of which six belong in the subfamily Anthiinae. Recent collections in the islands have resulted in six additions to the subfamily, and adjustment is needed of some of the anthiine names in the *Handbook*. In a revision of *Plectranthias* Bleeker, Randall (in press) will describe two new species of this genus from Hawaii, one of which was reported as *Pteranthias longimanus* Weber by Gosline and Brock. In addition he will record *P. winniensis* (Tyler) from the islands. *Pseudanthias kelloggi* (Jordan and Evermann 1905), which is only subspecifically distinct from *azumanus* (Jordan and Richardson 1910) from Japan, also belongs in the genus *Plectranthias*. A collection of ten postlarval specimens of *Luzonichthys* Herre (BPBM 19926, 26–30.6 mm SL) taken by mid-water trawl off Oahu in 1971 by Thomas A. Clarke appears to represent an undescribed species. Description of this form is delayed in the hope of obtaining adults of the species. Katayama (1975) described *Caprodon unicolor* from Midway. The other species of this genus in Hawaii, which has been identified as *C. schlegelii* (Günther) (type locality, Japan), appears to be undescribed. The species described as *Caesioperca thompsoni* by Fowler (1923) should be classified in the genus *Anthias*, subgenus *Pseudanthias*. Two new species of *Anthias*, one in subgenus *Pseudanthias* and one in subgenus *Mirolabrichthys*, are described herein. A paper on *Anthias pleurotaenia* (Bleeker), the type species of *Pseudanthias* Bleeker 1873, and the distinction of *Anthias* and *Pseudanthias* is in progress by P.C. Heemstra and Randall. The subgenus *Mirolabrichthys* Herre 1927 has been revised by Randall and Lubbock (in press). Although both new species of *Anthias* were first collected in the Hawaiian Islands, they were later taken at other Indo-Pacific localities.

The holotypes and some paratypes of the new species and subspecies are deposited in the Bernice P. Bishop Museum, Honolulu (BPBM). Other paratypes have been sent to the Australian Museum, Sydney (AM); British Museum (Natural History), London [BM(NH)]; California Academy of Sciences, San Francisco (CAS); Muséum National d'Histoire Naturelle, Paris (MNHN);

Natural History Museum of Los Angeles County (LACM); and National Museum of Natural History, Washington, D.C. (USNM).

Data in parentheses in the descriptions below apply to the paratypes if different from the holotype. Tables 1 to 3 present the meristic data of the three species of *Anthias*. Tables 4 to 6 consist of the proportional measurements of the type specimens of the new taxa. More measurements are given in these three tables than are summarized in the text.

KEY TO THE HAWAIIAN SPECIES OF *ANTHIAS*

- 1a. Second and third dorsal spines prolonged in adults (especially in males); front of upper lip of males thickened and moderately pointed; lateral-line scales 57 to 64; mandible naked; subopercular margin smooth in adults *bicolor* new species
- 1b. No dorsal spines prolonged; front of upper lip not thickened; lateral-line scales 39 to 58; mandible scaled; lower subopercular margin serrate.....2
- 2a. Anal soft rays 7; dorsal soft rays usually 16; pectoral rays 20 to 22; lateral-line scales 50 to 58; margin of posterior half of orbit rimmed with fleshy papillae *thompsoni*
- 2b. Anal soft rays 9; dorsal soft rays usually 17; pectoral rays 15 (rarely 16); lateral-line scales 39 to 46; margin of posterior half of orbit smooth..... *ventralis* new species

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Anthias (Mirolabrichthys) bicolor

NEW SPECIES

Figures 1–3; Tables 1–4

HOLOTYPE: BPBM 10146, 99.2 mm SL, male, Hawaiian Islands, Oahu, Waianae coast off Pokai Bay, small area of live coral with holes and ledges, 33.5 m, quinaldine, J. E. Randall, P. M. Allen and E. S. Helfman, 7 September 1970.

PARATYPES: BPBM 10141, 1(99.9 mm SL), Hawaiian Islands, Oahu, off Pokai Bay, patch of coral rubble with some live coral, 27.5 m, quinaldine, J. E. Randall, 31 August 1970; BPBM 10142, 4(76.5–99.2 mm SL), same data as preceding; CAS 35678, 1(94.5 mm SL), same data as holotype; USNM 215284, 1(63.8 mm SL), same data as holotype; BPBM 10145, 1(34.3 mm SL), Hawaiian Islands, Oahu, off Lahilahi Point, cave in 27.5 m, quinaldine, J. E. Randall, 7 September 1970; BPBM 19924, 2(26–26.9 mm SL), Hawaiian Islands off Oahu (21° 20'–30' N; 158° 20'–30' W), 200 m, 3.05-m Izaacs-Kidd midwater trawl, R/V *Teritu*, T. A. Clarke, 16 September 1970; BPBM 10173, 4(82.2–111 mm SL), Hawaiian Islands, Oahu, off Kahana Bay, W side at edge of channel, cave in 26 m, rotenone, J. E. Randall, 27 September 1970; ANSP 134235, 1(83.4 mm SL), same data as preceding; LACM 35579-1, 1(81 mm SL), same data as preceding; MNHN 1974-48, 1(76 mm SL), same data as preceding; BPBM 13344, 3(27.5–57.5 mm SL), Hawaiian Islands, Oahu, off Makapuu Point, collected from salvaged vessel raised from 68 m, W. D. Madden, 14 October 1970; BPBM 15498, 1(29 mm SL), Hawaiian Islands, Oahu, off Makaha, ledge in 44.5 m, rotenone, J. E. Randall, L. Taylor, P. M. Allen and A. Nahacky, 16 June 1973; BPBM 15877, 4(45.6–63 mm SL), New Guinea, Madang, Rausch Pass, S side, isolated coral block on sloping sand bottom, 34 m, quinaldine, J. E. Randall, 18 August 1973; BPBM 19930, 1(82 mm SL), Mauritius, W coast, Medine, off La Fouché, 32 m, quinaldine, J. E. Randall, 19 November 1973; BPBM 17959, 1(66.1 mm SL), Marshall Islands, Enewetak Atoll, Lagoon off Japtan (David) Island, small low-profile patch reef on sand in 18 m, rotenone, J. E. Randall, P. Lamberson and R. McNair, 13 December 1974; BPBM 18833, 1(72 mm SL), Maldives Islands, Villingili Island, lagoon reef, cave in 35 m quinaldine, J. E. Randall, 18 March 1975; MNHN 1975-1139, 1(74.5 mm SL), Hawaiian Islands, Oahu, off Makaha, ledge in 36.5 m, rotenone, J. E. Randall, P. S. Lobel, J. Culp and J. L. Earle, 3 May 1975; BPBM 19916, 1(72.3 mm SL), Loyalty Islands, Maré Island, 55 m, P. Laboute and Y. Magnier, 20 November 1975; AM 1.18721-001, 1(65 mm SL), same data as preceding; BM(NH) 1976.3.15.1, 1(66.5 mm SL), same data as preceding.

DIAGNOSIS: Dorsal rays X, 16 to 18 (usually 17); anal rays III, 7 or 8 (rarely 8); pectoral rays 19 to 21 (rarely 21); lateral-line scales 57 to 64; gill rakers 11 or 12 + 26 to 28; depth of body 2.74 to 3.04 in SL; third dorsal spine prolonged in adult females, and second and third spines prolonged in adult males; front of upper lip of males thickened and moderately pointed; no papillae along hind margin of orbit; margins of subopercle and interopercle smooth in adults; pelvic fins long, reaching at least to anus (generally to or beyond origin of anal fin); teeth on vomer large; patch of teeth on palatines broad (about 10 irregular rows of teeth at broadest place); no auxiliary scales on body; mandible naked; dorsal and anal fins naked; upper half of body yellow-orange in life, lower half lavender-pink; males with fleshy tips of elongate second and third dorsal spines yellow.

DESCRIPTION: Dorsal fin X, 17 (17 or 18, usually 17; two of 27 paratypes with XI, one of these with 16 soft rays); anal fin III, 8 (26 paratypes with 7, one with 8); pectoral rays 20 (19 or 20; one of 27 paratypes with 21 rays on one side), upper two unbranched; pelvic fin I, 5; principal caudal rays 15 (upper and lower unbranched); lateral-line scales 63 (60 on other side of holotype) (57–64); scales above lateral line to origin of dorsal fin 9 (8–9); scales below lateral line to origin of anal fin 23 (21–23); circumpeduncular scales 33 (31–33); gill rakers 12 + 27 (11–12 + 26–28); pseudobranchial filaments 20 (16–20); branchiostegal rays 7; vertebrae 26.



FIGURE 1. *Anthias (Mirolabrichthys) bicolor*, juvenile, 29 mm SL, Oahu, Hawaii, BPBM 15498.

Body somewhat elongate, the depth 2.82 (2.74–2.96) in SL (a little more elongate on non-Hawaiian specimens, the depth 2.84–3.04 in SL); body moderately compressed, the width 2.08 (1.97–2.36) in depth; head length 3.21 (2.81–3.23) in SL; snout 3.54 (3.36–4.27) in head, the front of upper lip of males thickened, somewhat pointed, and freely movable dorso-ventrally; diameter of orbit 4.34 (3.08–4.5) in head; posterior edge of orbit without fleshy papillae; interorbital space convex, the bony width 4.17 (3.86–4.4) in head; least depth of caudal peduncle 2.15 (2.15–2.84) in head.

Mouth oblique and moderately large, the maxilla reaching to or posterior to a vertical at rear edge of pupil; mouth terminal except on large males where it is slightly inferior due to hypertrophy of upper lip. Posterior end of maxilla rounded, its greatest depth 1.2 in orbit of holotype; no supplemental maxillary bone. Upper jaw with a band of villiform teeth which is broader anteriorly, the teeth at front enlarged; two large canine teeth anteriorly on each side of upper jaw (one laterally at front of jaw which is perpendicular in jaw and not curved, and a larger slightly curved one which lies nearly flat at posterior edge of the anterior band of villiform teeth); an outer row of enlarged teeth (13 to 15 on holotype) on side of jaw, the more posterior ones inclined forward and outward; lower jaw with a patch of villiform teeth anteriorly, the front ones enlarged; two large curved canine teeth on each side of lower jaw (one laterally at front of jaw which points outward and the other about one-third back in jaw which curves slightly posterior); a row of moderate-sized canines (14 to 17 on holotype) along jaw posterior to second large canine. Vomer with unusually large teeth (11 on holotype); palatines with a patch of villiform teeth in approximately 10 irregular rows at broadest place. Tongue pointed; upper surface with scattered very small papillae. Gill membranes free from isthmus. Gill rakers slender and long (largest 1.17 in orbit of holotype), notably longer than gill filaments (longest gill filament of first gill arch of holotype contained 1.5 in longest raker).

Opercle with three flattened spines, the central one the largest and most posterior, the upper one obtuse and indistinct, slightly anterior to lower; two lower spines acute; distance between tips of two lower spines about two-thirds the distance between central and upper spines; margins of subopercle and interopercle smooth

(except some juveniles that may have a few small serrae on these bones); lower margin of preopercle smooth; rounded corner and upper edge serrate (25 on holotype); serrae increase in number with size (12 in a 34-mm specimen, 15 in a 47-mm specimen, 22 in a 57.5-mm specimen, 23 to 30 in four specimens from 81 to 88 mm, and 36 in a 104-mm specimen). The 27.5 and 29-mm paratypes have 9 serrae on the preopercle, the lower two at the corner enlarged, especially the lowermost, which extends slightly beyond posterior margin of operculum; in addition, there are two spines on the interopercle (the one at upper edge large), one on the subopercle, and for the smaller specimen, two on the lower edge of the preopercle. These two specimens are similar morphologically to the two post-larvae (BPBM 19924, 26–26.9 mm SL) and clearly are transforming from the postlarval form. The post-larvae have the same spination on the opercular bones, although the two enlarged spines at the corner of the preopercle exhibit a distinct serration.

Anterior nostril in a short membranous tube (higher dorso-posteriorly) directly anterior to middle of eye about half the distance from edge of orbit to edge of groove separating upper lip from snout; posterior nostril large, situated diagonally dorso-posteriorly to anterior one, with little or no rim; greatest diameter of opening about equal to distance between nostrils, 6.5 in orbit of holotype.

Scales ctenoid; no auxiliary scales on body; head scaled except mandible, throat and gill membranes, extreme front of snout and a broad zone on side of snout anterior to center of eye, which includes nostrils in its upper part. Small juveniles clearly show five diagonal rows of scales on cheek between orbit and corner of preopercle (plus a single scale just above upper posterior corner of maxilla); in larger individuals small scales, which become progressively larger, develop between the orbit and the larger scales and near the margin of the preopercle; spinous portions of dorsal and anal fins naked, the soft portions scaled basally (scales extending farther out on interradiial membranes than on rays); caudal fin with small scales covering more than three-fourths distance to posterior margin; pectoral fins with small scales on basal third or more of fin; pelvic fins with small scales on medial surface.

Lateral line a smooth curve following contour of back; last pored scale slightly anterior to end of hypural plate. Some pores of cephalic lateralis system obscured by scales; prominent are: a pore in front of anterior nostril, one between nostrils, one medial to nostrils, two close together in interorbital space above front of eye, a series near edge of orbit around posterior half of eye, six on suborbital and preorbital region anterior to a vertical through center of eye, and six in a mandibular series beginning at end of lower margin of preopercle (last two on chin close together).

Origin of dorsal fin nearer a vertical at upper end of preopercular margin than upper end of gill opening; third dorsal spine prolonged in adult females, the length 4.85 to 5.82 in SL, more prolonged in males, 2.42 (2.65–3.21) in SL; second dorsal spine of females 7.51 to 8.28 in SL; second dorsal spine of males prolonged, 3.39 (2.63–2.93) in SL; tips of prolonged second and third dorsal spines of males with a short fleshy cirrus; longest dorsal soft ray 1.77 (1.79–2.02) in head; third anal spine 2.38 (2.12–2.37) in head; longest anal soft ray 1.23 (1.15–1.44) in head; caudal fin lunate, the lobes filamentous, caudal concavity 3.22 (3.47–3.8) in SL; longest rays of pectoral fins (tenth or eleventh) 3.77 (2.9–3.61) in SL; pelvic fins long, 2.49 (2.42–3.09) in SL, reaching to or beyond anus, and well beyond spinous portion of anal fin in males and small juveniles.

Color of adults and large juveniles in alcohol pale with no dark markings. Color of male holotype when fresh: upper half of body salmon, lower half lavender-pink; an orange-yellow band faintly edged in lavender running from lower part of eye to mid-pectoral base, lavender line continuing anterior to lower part of eye as a demarcation between orange-yellow color of most of snout and pale pinkish ventral part of head; indistinct pale red streak from beneath lower part of pectoral fin to above anus. Narrow red area basally at front of dorsal fin; dorsal fin mainly yellow with indistinct blotches of pale blue in middle, margin lavender, outer part of second and third and nearly all of fourth interspinous membranes red; fleshy cirri at tips of second and third spines bright yellow. Anal fin with pale blue membranes, shading outwardly to light red, rays pink, and margin pale bluish. Caudal fin with a broad zone of light red with a slight wash of yellow in lobes, shading on central and posterior part of fin to pale yellow with pink rays; pectoral fins pale pink. Pelvic fins colored much like anal fin, the lateral edge with pale bluish margin.

Color from field notes of a 99.9-mm female paratype (BPBM 10104) when fresh: upper half of body orange-yellow, lower half lavender pink (more lavender on abdomen and thorax); scales in zone of integration of color on mid-side with yellow centers and pink edges; some irregular streaks of scales with yellow centers extending a short distance into pink lower half of body; head above lower edge of eye orange-yellow, below lavender with a wash of orange, especially on maxilla and rest of head below and anterior to eye; horizontal lavender line between orange-yellow and lavender colors on snout; tip of lower jaw lavender; orange band nearly as broad as pupil and narrowly edged with lavender, running from lower posterior portion of orbit to pectoral base. Dorsal fin primarily pale red, irregularly yellow at base (yellow limited to first five interspinous membranes); margin lavender, and an indistinct sub-marginal zone of yellow; rays of fin rose red. Anal fin light lavender-pink with some yellow areas, rays slightly darker, margin

TABLE 1
Fin-ray counts of *Anthias*

species	Dorsal Rays					Anal Soft Rays				Pectoral Rays							
	X	XI	16	17	18	7	8	9	10	15	16	17	18	19	20	21	22
<i>bicolor</i>	26	2	1	21	6	26	2							10	17	1	
<i>thompsoni</i>	33		32	1		33									7	25	1
<i>ventralis</i>																	
<i>ventralis</i>	11			11				11			11						
<i>hawaiiensis</i>	19	1	1	17	2			19	1	19	1						



FIGURES 2–4. *Anthias* from Oahu, Hawaii. 2, Upper, *Anthias* (*Mirolabrichthys*) *bicolor*, holotype, male, 99.2 mm SL, BPBM 10146. 3, Middle, *Anthias* (*Mirolabrichthys*) *bicolor*, female, 83.5 mm SL, BPBM 10173. 4, Lower, *Anthias* (*Pseudanthias*) *thompsoni*, female, 126 mm SL, BPBM 11290.

lavender. Caudal lobes rose red; upper and lower edges narrowly lavender, with traces of yellow submarginally; centro-posterior part of fin light red-orange. Pectoral fins pale magenta, the membranes pale. Pelvic fins pale yellowish, the rays light lavender.

Color from an ekstrachrome transparency of 29-mm paratype (BPBM 15498; Fig. 1): upper half of body yellow, lower half lavender; dorsal fin pale yellow with violet margin. Pectoral fins lavender; remaining fins pale with a lavender cast, upper and lower margins of caudal fin, filamentous tip of pelvic fins, and tips of longest anal rays violet. In preservative, this fish shows a faint concentration of black pigment on the third interspinous membrane, a smaller spot of the same density on the second membrane, and a large but more diffuse one at the rear base of the spinous portion of the fin, extending in about equal area onto the body. In the 27.5-mm paratype these same dark areas are more evident. They are even more conspicuous on the two postlarvae (26–26.9 mm SL); in addition, the postlarvae have a blackish spot on the pelvic fins between the spine and the third ray about one-third distance from the base (only a faint remnant of this spot may be seen on the 27.5 and 29-mm specimens) and three less distinct blackish spots on caudal peduncle (dorsally, ventrally and at mid-base of caudal fin).

REMARKS: Adult and juvenile specimens of *A. bicolor* have been collected in the Hawaiian Islands, Marshall Islands, Loyalty Islands (kindly supplied by Pierre Fourmanoir of ORSTOM, New Caledonia), New Guinea, Maldive Islands and Mauritius in a depth range of 18 to 68 m. However, I have observed the species in 8 m in Hawaii, and aquarium fish collector Anthony Nahacky has seen it in as little as 5 m off Makua, Oahu. This fish usually is found in the vicinity of caves or ledges, but not infrequently it is encountered on small patch reefs where shelter seems minimal (even here an unexpected crevice generally will account for its presence). Typically it occurs in aggregations, though these may consist of only a few individuals. It feeds on zooplankton, and may rise as much as 3 or 4 m above the bottom in feeding. Although it may intermingle with feeding aggregations of *A. thompsoni*, it tends to maintain itself apart from this abundant Hawaiian species.

As in many other species of the subfamily Anthiinae, males are consistently larger than the females, probably as a result of sex reversal; also, they are notably less abundant than females. Although the differences in color between the sexes are not as marked as in some anthiines, the greatly prolonged second and



FIGURES 5–7. Species of the subgenus *Anthias* (*Pseudanthias*). 5, Upper, *Anthias ventralis hawaiiensis*, holotype, male, 76.9 mm SL, Oahu, Hawaii; BPBM 10560. 6, Middle, *Anthias ventralis hawaiiensis*, female, 51.8 mm SL, Oahu, Hawaii; BPBM 10159. 7, Lower, *Anthias ventralis ventralis*, male, 51.5 mm SL, Pitcairn Island; BPBM 16883.

third dorsal spines with a yellow cirrus at each tip clearly differentiates the male.

Two postlarvae (BPBM 19924) were collected in 200 m with a midwater trawl off leeward Oahu by Thomas A. Clarke of the University of Hawaii who kindly made them available as paratypes. The tow was made at 2006–2222 hours. The net remained open during descent and ascent, thus one cannot be certain of the depth of capture; however, the lowering and raising of the net required only 16 minutes of the 136-minute towing time.

The species appears to attain a larger size in the Hawaiian Islands than elsewhere. Four males in Hawaii range from 99.2 to 111 mm SL. Six males from outside Hawaii measure 63 to 82 mm SL. This difference may be due, at least in part, to the cooler water of the Hawaiian region. The largest non-Hawaiian specimen, however, is the 82-mm one from Mauritius, also a cool subtropical locality.

Named *bicolor* in reference to the salmon pink of the upper half and lavender pink of the lower half of the body. When viewed underwater in its usual moderately deep habitat (hence with shades of red subdued), the back appears more yellow and the lower side more blue, thus enhancing the bicolored effect and

making this species easily distinguished from *A. thompsoni*. Anticipating the scientific name, some fish fanciers in Hawaii already have begun to use the common name “Bicolored Bass” for this species.

Anthias (*Pseudanthias*) *thompsoni* Fowler 1923

Figure 4; Tables 1–3

Caesioperca thompsoni Fowler 1923. B. P. Bishop Mus., Occ. Pap. 8(7):379 (type locality, Honolulu).

DIAGNOSIS: Dorsal rays X,16 (one of 33 specimens with 17); anal rays III,7; pectoral rays 20 or 21 (usually 21, one of 33 with 22); lateral-line scales 50 to 58; gill rakers 10 to 12 + 25 to 28; depth of body 2.7 to 3.3 in SL; no dorsal spines prolonged (fifth spine usually the longest, but fourth to tenth spines nearly equal); front of upper lip of males not thickened and not pointed; posterior edge of orbit with a row of fleshy papillae; margins of subopercle and interopercle smooth; pelvic fins short, usually not reaching anus (just reaching anus in large males); caudal fin lu-

TABLE 2
Lateral-line scale counts of *Anthias*

species	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
<i>bicolor</i>																			2	5	4	6	6	2	2	1
<i>thompsoni</i>												1	1	2	6	8	7	4	2	2						
<i>ventralis</i>																										
<i>ventralis</i>	1	1	1	2	2	3			1																	
<i>hawaiiensis</i>		2	2	6	6	1	2	1																		

nate, the caudal concavity of large males up to 1.85 in SL; small villiform teeth on vomer forming a broad V-shaped (nearly triangular) patch; band of teeth on palatine narrow, consisting of only two irregular rows; auxiliary scales present over entire body; mandible scaled; dorsal and anal fins naked.

Color in alcohol pale with no dark markings. Color of an adult female when fresh: body red-orange dorsally, with a yellow spot basally on each scale; laterally the yellow has shifted to the edges of the scales, and the red-orange color is more magenta; ventrally the yellow fades to light lavender, and the scale centers to pale heliotrope. A double band, yellow above and magenta below, from lower edge of eye to lower opercle, then turning upward along margin of opercle to level of upper base of pectoral fin; a similar but faint double band extending onto snout from front of eye; a narrow yellow rim on posterior half of eye. Dorsal fin red; membranes mottled with yellow; margin of soft portion lavender. Anal rays salmon; the membranes light yellow; margin of anterior half of soft portion lavender (to tip of acute angle of margin). Caudal fin yellow-orange; upper and lower edges red, shading outwardly to lavender. Pectoral rays salmon, membranes transparent; base of fin yellowish with faint lavender marking in approximate V-shape. Pelvic rays salmon, membranes light yellow. Color of a large adult male is similar but the magenta streak on the head is broader with a wide band of yellow on either side; and the pectoral fin base more yellow with the lavender V more evident; large area of yellow on the basal rayed part of fin, with a faint broad outer margin of lavender; maxilla pale yellow, with a broad pale magenta border; lavender upper and lower margins of caudal fin and red submarginal lines are more pronounced, with a faint posterior margin of lavender and red submarginal line in central part of fin.

REMARKS: *A. thompsoni* is known only from the Hawaiian Islands. It is common near rocky vertical discontinuities in the bottom. Brock and Chamberlain (1968) commented on its abundance in loose schools on near-shore escarpments from submarin-

ing observations off the Waianae coast of Oahu. Strasburg, Jones and Iversen (1968) also observed it from a research submarine, in the depth range of 55 to 110 m, as did Clarke (1972:311) who noted that it was "seen frequently down to about 150 m, but never deeper."

Bishop Museum collections of this species have come from 26 to 157 m. It occurs in water at least as shallow as 10 m; however, it is not common in the lesser depths.

The stomach contents of six specimens, 98 to 119 mm SL, from three different lots, were examined. This material consisted entirely of zooplankton, primarily copepods. Also, shrimp larvae frequently were eaten. Adults feed up to several meters above the bottom (exceptionally as much as 9 m).

On April 25, 1972 I speared a jack (*Caranx melampygus*) 410 mm fork length off Barber's Point, Oahu that had three *A. thompsoni* in its stomach measuring 75 to 85 mm SL.

Females are much more numerous than males. Males have been observed in courtship; they elevate the dorsal fin during the display, which appears to take on a deeper red color; also, there is a red band along the back and a red border behind the operculum.

The holotype (BPBM 3376, 122 mm SL) is in the Bishop Museum and is in good condition. Corrections are in order for some of the counts given by Fowler in the description. The fish has 21 (not 22) pectoral rays, 54 (not 58) lateral-line scales, and 28 (not 27) lower-limb gill rakers. Fowler described *thompsoni* in *Caesioperca* Castelnau, a genus otherwise known only from temperate waters of Australia and New Zealand. A specimen of the type species of the genus, *C. rasor* (Richardson), was examined. It clearly is divergent from *thompsoni*, having a supplemental maxillary bone (absent in *thompsoni*), 21 dorsal soft rays, 14 pectoral rays, and a shallowly forked caudal fin.

The largest specimen of *A. thompsoni* (BPBM 15443) measures 149 mm SL. The Natural History Museum of Los Angeles County has specimens in two series (LACM 32242-1, 15:89-144

TABLE 3
Gill-raker counts of *Anthias*^a

species	Upper Limb						Lower Limb							
	7	8	9	10	11	12	21	22	23	24	25	26	27	28
<i>bicolor</i>					13	15						6	15	7
<i>thompsoni</i>				2	14	7					3	9	15	6
<i>ventralis</i>														
<i>ventralis</i>	2	9					1	4	3	3				
<i>hawaiiensis</i>	1	14	5					4	7	6	3			

^aGill-raker counts were made on the first arch and include all rudiments; the raker at the angle is included in the lower-limb count.

TABLE 4

Measurements of type specimens of *Anthias* (*Mirolabrichthys*) *bicolor* expressed as a percentage of the standard length

	HOLOTYPE	PARATYPES				
	BPBM 10148	BPBM 15498	BPBM 13344	BPBM 10142	BPBM 10173	BPBM 10173
Standard length (mm)	99.2	29.0	47.0	67.6	88.3	104.3
Depth of body	35.4	33.8	35.5	36.5	34.5	35.7
Width of body	17.0	15.5	15.0	17.0	17.5	18.2
Head length	31.2	35.5	32.0	33.9	31.0	31.9
Snout length	8.8	8.6	7.5	8.7	8.2	9.5
Diameter of orbit	7.2	11.5	10.2	8.5	7.8	7.1
Bony interorbital width	7.5	8.3	8.3	7.7	7.8	8.1
Length of maxilla	16.4	15.6	15.1	15.8	15.9	16.9
Least depth of caudal peduncle	14.5	12.5	13.6	15.1	14.4	14.8
Length of caudal peduncle ⁴	21.0	20.0	21.3	20.7	21.5	21.3
Predorsal length	26.9	29.9	26.2	27.2	25.6	26.5
Preal length	62.2	62.4	63.5	65.2	62.7	64.2
Prepelvic length	33.3	36.2	33.7	35.3	33.3	35.4
Length of first dorsal spine	4.3	6.5	—	4.7	5.1	5.1
Length of second dorsal spine	29.5	13.3	12.1	13.3	12.3	38.0
Length of third dorsal spine	31.2	15.5	—	20.6	17.2	41.3
Length of tenth dorsal spine	10.5	14.5	14.3	13.9	11.4	11.9
Length of longest dorsal ray	17.6	17.5	17.6	17.9	17.0	17.8
Length of dorsal fin base	65.4	63.2	65.8	63.6	65.6	66.6
Length of first anal spine	7.0	8.9	8.5	7.1	6.9	8.0
Length of second anal spine	—	19.7	17.6	16.6	14.2	14.1
Length of third anal spine	13.1	15.2	15.1	14.6	13.1	13.7
Length of longest anal ray	25.2	31.0	25.0	23.4	24.7	26.9
Length of anal fin base	18.5	20.7	19.5	19.6	18.7	19.0
Length of pectoral fin	26.5	34.4	30.2	31.2	28.1	27.7
Length of pelvic spine	16.1	21.0	18.2	18.1	16.4	16.2
Length of pelvic fin	40.1	41.4	33.4	32.9	32.4	41.2
Length of caudal fin	44.4	52.4	51.7	44.7	40.3	47.5
Caudal concavity ⁵	31.0	28.9	34.9	29.6	26.3	33.7

⁴Measured diagonally from rear base of anal fin to mid-base of caudal fin.

⁵Measured horizontally between verticals at tips of shortest and longest caudal fin rays.

mm SL; LACM 32668–14, 17:83–148 mm SL), which are nearly as large. These were taken by trawl off Haleiwa, Oahu in 120 m.

John E. Fitch of the Department of Fish and Game, State of California, examined the otoliths from these LACM specimens. He detected one presumed annular ring in the otoliths of four specimens 83–95 mm, two in 14 specimens 93–112 mm, three in three specimens 112–127 mm, four in four specimens 137–140 mm, and five in a 145-mm specimen. He wrote me, “. . . While they (the otoliths) are not the best in the world for reflecting ages, I feel reasonably certain of my readings.”

Five postlarval specimens of *A. thompsoni* (BPBM 19925, 23.4 to 24.3 mm SL) were collected off leeward Oahu by Thomas A. Clarke of the University of Hawaii from the R/V *Teritu* in a 3.05-m midwater trawl at a depth of 225 m on 11 June 1971. The time of the tow was 0200–0416 hours; the lowering and raising of the net required 18 minutes of this time. These fish have a very long serrate spine at the corner of the preopercle (nearly as long as diameter of orbit), with 7 to 9 smaller spines on upper limb of preopercle (adjacent spine somewhat enlarged and serrate), and three spines on lower limb (middle spine somewhat enlarged and serrate); also, there is a spine on the subopercle and 2 to 5 on the interopercle. There are no distinctive large blackish spots as on the postlarvae of *A. bicolor*, but there is a

concentration of dark pigment basally on the third interspinous membrane of the dorsal fin and lesser dark blotches may be found on the lower part of the second membrane and basally on the fourth to seventh spines. Also a small amount of dark pigment may be seen on some specimens on the membranes behind the tips of the second to seventh spines and near the base of the pelvic fins centered on the first and second soft rays. As in many postlarvae, there are some fine dots of melanin over the occipital region of the head.

Anthias (*Pseudanthias*) *ventralis hawaiiensis*

NEW SPECIES AND SUBSPECIES

Figures 5–6; Tables 1–3, 5

HOLOTYPE: BPBM 10560, 76.9 mm SL, male, Hawaiian Islands, Oahu, Moku Manu; off N side at base of drop-off, 49 m, rotenone, J. E. Randall, W. J. Baldwin and A. Stark, 9 October 1968.

PARATYPES: BPBM 10561, 7(38.3–71.1 mm SL), same data as holotype; ANSP 134236, 1(62.5 mm SL), same data as holotype; AM I.18720–001, 1(49 mm SL), same data as holotype; BM(NH) 1976.3.15.2, 1(65.1 mm SL), same data as holotype; LACM 35578–1, 1(69.4 mm SL), same data as holotype; BPBM 10159, 3(36.3–62.2 mm SL), Hawaiian Islands, Oahu, off Kahana Bay, NW side of channel at entrance to bay, ledges and caves in 26 m, quinaldine, J. E. Randall and P. M. Allen, 12 September 1970; MNHN 1974–17, 1(60.2 mm SL), same data as preceding; BPBM 10172, 1(52.9 mm SL), same locality as

TABLE 5

Measurements of type specimens of *Anthias (Pseudanthias) ventralis hawaiiensis* expressed as a percentage of the standard length

	HOLOTYPE	PARATYPES				
	BPBM 10560	BPBM 15058	BPBM 10159	BPBM 10159	BPBM 10159	BPBM 10561
Standard length (mm)	76.9	24.0	36.3	51.8	62.2	71.1
Depth of body	37.8	35.8	35.4	34.7	34.0	38.4
Width of body	18.6	17.4	15.8	16.4	15.6	18.4
Head length	29.7	34.5	33.6	31.4	30.5	30.0
Snout length	7.4	7.5	7.4	7.2	7.3	7.7
Diameter of orbit	7.8	11.6	11.0	9.9	8.8	8.3
Bony interorbital width	8.9	9.2	9.1	8.9	8.9	9.0
Length of maxilla	14.8	15.8	15.4	14.2	14.4	14.5
Least depth of caudal peduncle	15.0	14.1	15.1	14.9	14.5	15.1
Length of caudal peduncle	20.7	19.7	19.6	18.7	20.2	19.2
Predorsal length	32.4	32.1	33.1	32.6	32.7	32.8
Preanal length	60.2	63.3	62.0	63.1	61.7	62.5
Prepelvic length	33.2	35.3	33.1	33.7	32.1	33.7
Length of first dorsal spine	5.8	5.6	5.5	5.6	5.0	5.3
Length of longest dorsal spine	12.9	16.0	15.7	15.3	13.4	13.2
Length of longest dorsal ray	32.3	18.8	23.8	21.8	26.2	30.0
Length of dorsal fin base	62.6	54.5	61.1	59.9	60.0	60.8
Length of first anal spine	6.2	7.9	7.7	7.1	6.4	6.1
Length of second anal spine	12.9	16.3	17.2	15.2	12.9	12.7
Length of third anal spine	13.6	15.8	16.6	14.3	12.9	12.8
Length of longest anal ray	40.2	30.8	30.3	32.4	37.5	39.4
Length of anal fin base	23.4	22.9	22.9	22.3	22.3	21.6
Length of pectoral fin	30.9	33.3	32.5	31.4	30.2	32.1
Length of pelvic spine	16.0	19.1	19.8	17.2	15.8	15.5
Length of pelvic fin	49.7	37.0	28.5	37.6	43.2	—
Length of caudal fin	32.7	48.0	36.3	35.5	34.6	37.0
Caudal concavity	11.8	24.1	14.0	13.7	12.5	16.2

preceding, rotenone, J. E. Randall, 27 September 1970. CAS 35679, 1(41.8 mm SL), Hawaiian Islands, Oahu, off Makapuu Point, collected from salvaged vessel raised from 68 m, W. D. Madden, 14 October 1970; USNM 215285, 1(43.8 mm SL), same data as preceding; BPBM 15058, 1(24 mm SL), Hawaiian Islands, Hawaii, South Point, large boulders and adjacent sand, 28 m, rotenone, L. Taylor and P. M. Allen, 21 May 1973.

DIAGNOSIS: Dorsal rays X, 16 to 18 (usually 17); anal rays III, 9 (rarely 10); pectoral rays 15 (rarely 16); lateral-line scales 40 to 46; gill rakers 7 to 9 + 22 to 25; depth of body 2.37–2.94 in SL; no dorsal spines prolonged (fifth spine usually the longest, but fourth to tenth nearly as long); front of upper lip of males not thickened and pointed; no papillae along rim of posterior half of eye; margin of subopercle serrate, and a few serrae may be present on upper posterior edge of interopercle; pelvic fins long, reaching well beyond origin of anal fin (entirely beyond base of fin in adult males); a few small teeth on vomer in an approximately triangular patch; band of teeth on palatines narrow, consisting of two or three irregular rows; a few auxiliary scales dorsally on body; mandible scaled; dorsal and anal fins scaled except distally. Color as in figures 5 and 6, the most conspicuous feature being the yellow of the upper half of the head with a few short lines of violet or magenta behind and above the eye.

DESCRIPTION: Dorsal fin X, 17 (X, 17 except one paratype with XI, 18, one with X, 18, and one with X, 16); anal fin III, 9 (one of 19 paratypes with 10); pectoral rays 15 (one of paratypes with 16), upper one or two and lowermost unbranched; pelvic fin

I, 5; principal caudal rays 15 (upper and lower unbranched); lateral-line scales 42 (40–46); scales above lateral line to origin of dorsal fin 5; scales below lateral line to origin of anal fin 19 (18–20); circumpeduncular scales 22; gill rakers 8 + 25 (17–9 + 22–25); pseudobranchial filaments 11 (10–12); branchiostegal rays 7; vertebrae 26.

Body depth variable, 2.65 (2.37–2.94) in SL; body moderately compressed, the width 2.03 (2.04–2.25) in depth; head length 3.37 (2.9–3.33) in SL; snout 4.02 (3.9–4.6) in head; front of upper lip of males not thickened and not pointed (contour of front of upper lip when viewed from above varying from slightly convex to flat); diameter of orbit 3.81 (2.97–3.6) in head; posterior edge of orbit without fleshy papillae; interorbital space smoothly convex, the bony width 3.34 (3.33–3.75) in head; least depth of caudal peduncle 1.98 (1.98–2.44) in head.

Mouth oblique and moderately large, the maxilla reaching posterior to a vertical at center of eye and often to or slightly beyond a vertical at posterior edge of pupil; lower jaw projecting slightly when mouth closed; upper posterior corner of maxilla more broadly rounded than lower; greatest depth of maxilla 2 in orbit of holotype; no supplemental maxillary bone. Upper jaw with inner row of villiform teeth of moderate size broadening to a maximum of about 4 rows anteriorly, the innermost and most medial of these teeth notably enlarged, lying nearly flat, and directed inward; a canine laterally at front of upper jaw, followed by a row of 13 teeth along side of jaw, which are about as long as front canine but more slender; posterior ones pointing forward;

TABLE 6
Measurements of type specimens of *Anthias (Pseudanthias) ventralis ventralis*
expressed as a percentage of the standard length

	HOLOTYPE	PARATYPES			
	BPBM 16883	BPBM 13530	BPBM 13530	BPBM 13530	BPBM 19895
Standard length (mm)	51.5	20.4	31.8	50.8	54.3
Depth of body	35.1	32.9	32.0	33.4	33.4
Width of body	16.5	15.7	15.7	16.7	16.2
Head length	31.5	36.8	33.4	31.8	33.0
Snout length	7.8	7.9	7.6	7.7	7.7
Diameter of orbit	10.3	12.5	11.3	9.6	9.6
Bony interorbital width	8.8	9.0	8.5	8.9	8.7
Length of maxilla	14.5	15.7	14.1	14.9	14.9
Least depth of caudal peduncle	14.4	13.7	14.6	14.3	14.2
Length of caudal peduncle	18.9	19.4	20.4	19.2	18.6
Predorsal length	33.2	34.8	33.1	33.2	32.3
Preanal length	61.0	63.7	63.1	60.3	61.7
Prepelvic length	33.2	36.6	34.0	33.0	33.2
Length of first dorsal spine	6.2	6.3	5.8	6.1	6.2
Length of longest dorsal spine	13.4	16.2	15.7	13.9	13.1
Length of longest dorsal ray	27.0	18.1	17.7	29.7	29.5
Length of dorsal fin base	60.2	53.9	56.8	61.0	58.2
Length of first anal spine	7.4	7.8	7.7	7.3	7.1
Length of second anal spine	14.4	15.7	15.7	13.8	14.0
Length of third anal spine	13.8	15.7	15.4	13.8	13.3
Length of longest anal ray	35.4	21.5	25.1	32.6	40.8
Length of anal fin base	21.4	22.5	22.1	22.0	21.8
Length of pectoral fin	32.4	30.6	32.1	33.4	32.6
Length of pelvic spine	16.7	19.7	17.9	17.1	16.4
Length of pelvic fin	39.3	29.4	29.2	44.7	54.3
Length of caudal fin	38.3	—	37.8	—	43.7
Caudal concavity	17.8	—	15.7	—	21.5

a pair of moderate canines anteriorly in lower jaw that project slightly forward; two to three rows of smaller, incurved teeth medial to anterior canines; four or five strongly retrorse canines along side of anterior third of lower jaw; posterior to these are a series of uniformly large teeth (six on one side of holotype, nine on other) that point forward strongly, these closely associated with an outer row of smaller more slender teeth. Teeth on vomer small, in a patch of approximately triangular shape; a narrow band of two or three rows of small teeth on palatines. Tongue pointed. Gill membranes free from isthmus. Gill rakers slender and long, about as long as longest gill filaments; length of the longest contained 1.6 times in diameter of orbit of holotype.

Opercle with three flattened spines; the central one the largest and most posterior; the upper spine obtuse and indistinct, slightly anterior to lower; two lower spines acute, distance between their tips generally about three-fourths distance between central and upper spines. Lower edge of preopercle smooth; upper edge finely serrate (25 serrae on holotype; number of serrae variable, but tending to increase with size; paratypes from 24 to 42 mm SL have 16 to 23 serrae whereas those over 50 mm have 22 to 36); ventral edge of subopercle with 14 (4 to 14) serrae; interopercle with 4 (0–4) serrae near upper end.

Anterior nostril in a membranous tube (higher dorsoposteriorly) directly anterior to middle of eye and about halfway between edge of orbit and groove separating upper lip from rest of snout; posterior nostril large, dorso-posterior to anterior one, roughly semicircular, and without a rim; its greatest diameter nearly

equals its distance from anterior nostril (about 6 in diameter of orbit of holotype).

Scales ctenoid; some auxiliary scales may be present on nape and body dorsal to lateral line. Head scaled except throat, gill membranes, extreme front of snout, and a broad zone of snout from level of lower edge of eye to above nostrils. Dorsal and anal fins with scales on about basal half (ignoring prolonged rays and associated membranes); caudal fin with small scales extending about three-fourths distance to posterior margin; pectoral fins scaled on about basal third; pelvic fins scaled on medial surface, the scales on first ray extending slightly beyond the pelvic spine.

Lateral line a little more strongly arched than upper contour of body, reaching highest point below posterior half of spinous portion of dorsal fin; last pored-scale of lateral line just anterior to posterior edge of hypural plate. Pores of cephalic lateralis system similar to those of *A. bicolor*.

Origin of dorsal fin above (or slightly anterior or posterior) to upper end of gill opening; no dorsal spines prolonged; fifth dorsal spine usually the longest, 2.3 (2.05–2.28) in head; a small cirrus behind tip of each dorsal spine; twelfth dorsal soft ray (and to a lesser extent adjacent rays) prolonged (except in small juveniles), its length 3.1 (3.33 to 4.2) in SL; third anal spine 2.18 (2.02–2.36) in head; fourth anal soft ray (and to a lesser extent adjacent rays) greatly prolonged, its length 2.49 (2.54–3.3) in SL; caudal fin deeply emarginate, the caudal concavity 2.52 (1.43–2.44) in head; longest ray of pectoral fins (ninth) 3.24 (3.0–3.31) in SL; second pelvic ray (and to a lesser extent adjacent

rays) greatly prolonged, reaching beyond spinous portion of anal fin and often posterior to base of fin, the ray length 2.01 (2.17–3.51) in SL.

Color in alcohol pale with no dark markings. Color of holotype and other large males when fresh (from field notes): anterior part of body orange, dotted with magenta, shading to light yellowish with a lavender wash on thorax and abdomen, and to violet posteriorly. Upper half of head yellow with dotted lines of magenta as follows: from snout in front of eye through upper edge of eye and passing dorsally to nape, from behind eye along upper edge of opercle, from in front of lower part of eye through lower edge of eye and across middle of operculum to middle opercular spine; lower half of head varying from light yellowish to pale lavender. Dorsal fin orange, edged with magenta (except posteriorly); rear basal part nearly colorless; anal fin with anterior part (including prolonged rays) orange, posterior portion yellow, the two regions separated by a magenta line; caudal fin yellow-orange, shading to magenta in broad median posterior part of fin; pectoral fins pale orangish with a large magenta-edged orange spot on base; pelvic fins orange with a little magenta on leading edge of spine; isthmus yellow-orange (see Fig. 5).

Color of females when fresh similar but body mostly yellow instead of orange, the yellow unmarked dorsally, over posterior part of caudal peduncle and most of caudal fin; ventral half of body lavender; magenta lines on head more solid (and hence more evident) on females than males; anal fin almost entirely yellow, lacking the striking two-tone coloration with magenta division of the male; yellow spot at base of pectoral fin not as conspicuous as the orange basal spot on the fin of the male (see Fig. 6).

REMARKS: The Hawaiian population of *Anthias ventralis* is sufficiently distinct to warrant subspecific recognition, hence *hawaiiensis*. See "Remarks" of *A. v. ventralis* for discussion of differences.

The Hawaiian subspecies was collected in the depth range of 26 to 68 m. Nearly all specimens were taken from caves or beneath well-formed ledges. They are more closely tied to the substratum than the other two *Anthias* in Hawaii and are often seen swimming upside down near the roof of caves. They venture out for feeding on zooplankton (mainly copepods, but also other crustacean larvae, fish eggs, mollusk larvae, polychaete larvae, etc.).

This species is a good aquarium fish, though not often caught due to its deep-dwelling habits. It is hardier than the other two Hawaiian *Anthias* in aquaria.

Named *ventralis* in reference to the striking prolongation of the pelvic and anal fins.

The common name "Longfin Bass" is proposed for this species.

Anthias (Pseudanthias) ventralis ventralis

NEW SUBSPECIES

Figure 7; Tables 1–3, 6

HOLOTYPE: BPBM 16883, 51.5 mm SL, male, Pitcairn Island, patch reef on N side off Gannet Ridge, 40 to 44 m, rotenone, J. E. Randall, D. B. Cannoy, J. R. Haywood, R. R. Costello, J. D. Bryant and S. Christian, 6 January 1971.

PARATYPES: BPBM 13530, 8(18.2–50.8 mm SL), Tuamotu Archipelago, Gambier Group, Temoe Atoll, outside reef on N side, isolated dead coral block on sand near fringing reef, 41.3 m, rotenone, J. E. Randall, D. B. Cannoy, R. McNair and R. R. Costello, 16 December

1970; BM(NH) 1973.3.5.1, 1(29.4 mm SL), same data as preceding; LACM 35586–1, 1(21 mm SL), same data as preceding; USNM 215289, 1(29.8 mm SL), same data as preceding; BPBM 19895, 1(54.3 mm SL), New Caledonia, false pass Uitoé (about 3 km N of Dumbéa Pass), 55 m, bottom mainly coral rubble, rotenone, P. Laboute and Y. Magnier, 5 November 1975.

DIAGNOSIS: As in *Anthias ventralis hawaiiensis*, except for slightly lower gill-raker counts (see Table 3), more interopercular serrae, smaller size and color (see below).

DESCRIPTION: Dorsal rays X,17; anal rays III,9; pectoral rays 15 (upper one or two and lower one or two unbranched); pelvic rays I,5; principal caudal rays 15 (upper and lower unbranched); lateral-line scales 44 (39–46); scales above lateral line to origin of dorsal fin 5 (4 or 5); scales below lateral line to origin of anal fin 19 (18–19); circumpeduncular scales 22 (20–22); gill rakers 8 + 24 (7–8 + 21–24); pseudobranchial filaments 10 (9–10); branchiostegal rays 7; vertebrae 26.

Body depth 2.85 (2.86–3.13) in SL; width of body 2.13 (2.0–2.09) in depth; head length 3.17 (2.72–3.14) in SL; snout 4.05 (4.14–4.67) in head; front of upper lip of males not thickened and not pointed; diameter of orbit 3.08 (2.94–3.43) in head; interorbital space convex, the bony width 3.58 (3.58–3.93) in head; least depth of caudal peduncle 2.19 (2.22–2.67) in head.

Dentition similar to *A. v. hawaiiensis*: 14 large teeth along one side of upper jaw of holotype, and 15 on the other; more small teeth posterior to large ones on side of lower jaw than in *hawaiiensis*. Tongue, gill rakers, nostrils and head pores comparable to *hawaiiensis*.

Opercular spines and serrae of preopercle and subopercle as in *A. v. hawaiiensis*; holotype with 24 serrae on preopercle and 9 on subopercle. There are, however, usually more serrae on the average on the interopercle of *A. v. ventralis* (4 on holotype and 1 to 6 on paratypes).

Squamation similar to *A. v. hawaiiensis* except there are very few auxiliary scales on dorsal body scales, and small scales do not extend as far out on the median fins.

Origin of dorsal fin above upper end of gill opening; no dorsal spines prolonged; fifth to ninth dorsal spines the longest, 2.37 (2.13–2.52) in head; a small cirrus behind tip of each dorsal spine; twelfth dorsal soft ray, and to a lesser extent the eleventh and thirteenth, prolonged in adults, its length 3.7 (3.37–5.65) in SL; third anal spine 2.28 (2.17–2.47) in head; fourth anal soft ray, and to a lesser extent third and fifth rays, prolonged, 2.83 (2.45–4.65) in SL; caudal fin deeply emarginate, the caudal concavity 1.77 (1.53–2.12) in head; longest ray of pectoral fins (ninth) 3.09 (3.0–3.27) in SL; second pelvic ray, and to a lesser extent adjacent rays, greatly prolonged, reaching beyond spinous portion of anal fin and in some larger individuals posterior to rear base of anal fin, the ray length 2.54 (2.24–3.42) in SL.

Color in alcohol uniform pale with no dark markings. Color of holotype and other males when fresh: orange-yellow with small spots of lavender dorsally, shading to lavender on sides (zone of intergradation, especially anteriorly, with yellow streaks extending ventrally into lavender zone and vice versa), and to pale yellow ventrally. Snout, tip of chin, and postorbital part of head above level of center of eye bright yellow; lower part of head and all of thorax pale yellow; deep yellow streak mid-ventrally on head; broken line of lavender running from upper lip to eye; horizontal lavender band behind eye separating upper bright yellow and lower pale yellow of head; an arc of lavender beginning on

opercle anterior to gill opening, rimming upper gill opening and joining posterior end of horizontal lavender line of postorbital head; broken lavender line on nape from upper edge of orbit to origin of dorsal fin. Dorsal fin yellow with a few small lavender spots basally; spines and adjacent membrane tips magenta; anterior margin of soft portion lavender; faint diagonal light blue line in fin running in part on eleventh to thirteenth soft rays; anal fin with a broad yellow-orange streak edged in lavender from origin of fin to tip of prolonged fourth ray; remainder of fin light yellow; caudal fin light yellow with lavender upper and lower margins basally, shifting to light blue distally; posterior edge of caudal fin in central part with faint light blue margin; faint wavy vertical dark-edged light blue band near middle of caudal fin; pectoral fins light yellowish with large semicircular yellow-orange spot edged in lavender at base; pelvic fins yellow, deeper yellow laterally, with lavender lateral margin. Iris yellow with two broad diagonal streaks of blue (dorso-anterior and ventro-posterior to pupil).

Color of a 33-mm female from the atoll of Temoe, Tuamotu Archipelago when fresh: body light magenta dorsally, shading to pale lavender ventrally and white on abdomen and thorax (lavender mid-ventrally), except for a zone of bright yellow above a line of demarcation from mid-base of dorsal fin to lower base of caudal fin (a deep orange streak separates the yellow and magenta from below base of fifth soft dorsal ray to anterior caudal peduncle). Tip of lower jaw and front of snout bright yellow; upper postorbital head light magenta; prominent V-shaped mark of deep yellow, edged with orange from apex at origin of dorsal fin to dorso-posterior edge of orbit of either side. Dorsal fin bright yellow; spines tipped with magenta; margin of anterior soft portion of fin lavender; anal fin similar but entire fin becoming lavender posteriorly; caudal fin light yellow, the upper and lower edges narrowly magenta; pectoral fins pale; pelvic fins pale with a broad deep yellow streak on first to third soft rays and associated membranes.

REMARKS: *A. v. ventralis* has been collected in the Pitcairn Group, Tuamotu Archipelago, and New Caledonia from 40 to 55 m. In addition, my associates and I obtained one specimen in 46 m from a cave in a vertical drop-off at the west end of Enewetak Atoll, Marshall Islands on July 5, 1975. This specimen is unusual in having five opercular spines on one side and four on the other, instead of the usual three, and mainly for this reason it is not regarded as a paratype. In other respects it is typical of the subspecies.

Populations of reef fishes in the Hawaiian Islands often are distinct from elsewhere in Oceania. The differences may be so slight as to not warrant nomenclatural recognition, or they may be of equal magnitude to those that separate many sympatric marine species. In the case of *A. ventralis*, recognition of the Hawaiian variant as a subspecies seems to be the best treatment. *A. v. hawaiiensis* differs in having slightly higher gill-raker counts, fewer interopercular serrae, a deeper body on the average (depth 2.37–2.94 compared to 2.85–3.13 for *A. v. ventralis*), larger size (largest 76.9 mm, compared to 54.3 mm for *A. v.*

ventralis; since three of the four localities for *A. v. ventralis* are from higher latitudes than Oahu, one cannot explain the larger size as a cool-water effect), and color. The females in Hawaii do not have such a sharp demarcation of the yellow dorsoposteriorly on the body from lavender or magenta on the side, and the males in Hawaii have an orange-red wash over the middle and anterior part of the body (except ventrally) plus more orange and red in the fins. It is possible, however, that a larger male than any taken thus far outside Hawaii will have more red and orange color.

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